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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,063	02/11/2004	Takashi Sato	Q79869	3316
23373 7590 05/28/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
MILLER, MICHAEL G				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/775,063

Applicant(s)

SATO ET AL.

Examiner

MICHAEL G. MILLER

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6 and 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

- 1) A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09 MAY 2008 has been entered.

Response to Amendment

- 2) As a result of the submission filed 09 MAY 2008, the following amendments have been made to the claims in this case.
 - a) Claim 1 has been amended to include the limitation of Claim 5 in its preamble.

This limitation, 'for use in a magnetic disk apparatus of a load / unload system', is being given weight insofar as the magnetic disk must be capable of this use.
 - b) Claim 1 has been amended to remove the limitation 'wherein the mixed gas contains no hydrogen gas'.
 - c) Claim 1 has been amended to include the limitation 'wherein a content of the nitrogen gas with respect to the hydrocarbon-based gas falls within a range between 0.5% and 6%'.

- d) The amendments to Claim 1 introduce no new matter into the application and are therefore accepted.
 - e) Claim 5 has been cancelled.
 - f) Claims 6 and 7 have been added. These claims introduce no new matter into the application and are therefore accepted.
- 3) Claims 1-4 and 6-7 are pending. Claim 5 is cancelled.

Response to Arguments

- 4) Applicant's arguments filed 09 MAY 2008 have been fully considered but they are not persuasive.
- 5) Applicant's first argument is that the prior art of record, by virtue of teaching magnetic media in the context of CSS systems, cannot anticipate the problems associated with LUL systems. Examiner respectfully disagrees. Irregularities in the surface of either type of media will cause errors in data storage; in the case of LUL, the signal may be diminished and stored incorrectly; in the case of CSS, the irregularity will cause a deviation in the movement of the write head which will lead to incorrect and incomplete storage. Further, the irregularities in the surface of the media will cause damage to the write head in either system and as such are desirable to be removed from either system.
- 6) Applicant's second argument is that the prior art does not teach using a mixed gas comprising a hydrocarbon-based gas and a nitrogen gas. Examiner respectfully disagrees and refers the Applicant to paragraphs 237-239 of Sakaguchi as cited in

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the previous final rejection, which teaches premixing hydrogen and a hydrocarbon-based gas and then adding a nitrogen gas to the mixture.

- 7) Applicant's third argument is that the prior art does not teach the claimed ratio of nitrogen gas to hydrocarbon gas. Examiner respectfully disagrees and again refers the Applicant to paragraphs 237-239 of Sakaguchi, which teaches ratios of gases which encompass the claimed ranges of Applicant and further teaches that the amount of nitrogen helps determine the durability of the protective layer, which is a stated aim of Applicant in the arguments.
- 8) Applicant's fourth argument is that neither Veerasamy et al nor Suzuki et al correct the deficiencies of Sakaguchi et al. Examiner respectfully takes the position that the aforementioned deficiencies (see Applicant's first three arguments) are in fact present in Sakaguchi et al or are common sense and, as such, their presence or lack thereof in Veerasamy et al or Suzuki et al is moot.
- 9) As such, Examiner maintains the rejections of Claim 1 as amended and Claims 2-4 as previously presented. These rejections, along with the newly presented rejections of Claims 6-7, are presented below for the applicant's convenience.

Claim Rejections - 35 USC § 103

- 10) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11) The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

- (1) Determining the scope and contents of the prior art.
- (2) Ascertaining the differences between the prior art and the claims at issue.
- (3) Resolving the level of ordinary skill in the pertinent art.
- (4) Considering objective evidence present in the application indicating obviousness or nonobviousness.

12) This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13) Claims 1-2 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi et al (U.S. PGPub 2002/0064606, hereinafter '606) in view of Veerasamy et al (U.S. Patent 5,858,477, hereinafter '477).

14) With specific regard to Claim 1, '606 teaches a method of producing a magnetic disk for use in a magnetic disk apparatus of a load / unload system, comprising:

- a) Forming at least a magnetic layer (32) on a disk substrate (S) (Figure 2).
- b) Thereafter forming a carbon-based protection layer (33) by plasma CVD (paragraphs 0218 - 0220, Figure 1)

- i) Performed using a mixed gas of a hydrocarbon-based gas and a nitrogen gas without containing an inactive gas (paragraphs 0237 - 0239).
- ii) Performed under the condition that the disk substrate with the magnetic layer formed thereon is kept at 250°C (paragraphs 0166 -0168).
- c) '477 teaches the use of an acetylene - nitrogen system to deposit diamond-like carbon layers using P-CVD over magnetic recording media films (Column 18 Lines 12 - 53 for the acetylene - nitrogen system, Column 11 Lines 20-32 for the teaching that nitrogen may be continuously fed with the acetylene to nitrogenate the resultant diamond-like carbon film).
- d) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the method of '606 with the technique of '477 because '606 wants to deposit a diamond-like carbon layer on a magnetic recording media using P-CVD and '477 teaches a feed gas system for doing so.
- e) '606 discloses gas ratios in paragraphs 0237-0239 which include the claimed ratio of nitrogen gas to hydrocarbon gas. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to control the nitrogen concentration to obtain a desired durability of the protective layer, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 223 (CCPA 1955).

f) With regard to the use in a load / unload system, Examiner takes the position that:

- i) The product resulting from the method of '606/477 fulfills the limitation of Claim 1 because it is capable of being used in a load/unload system. Examiner cites as evidence Morikawa et al (U.S. Patent 6,946,191, hereinafter '191), which teaches in the background that the two major differences between CSS and LUL systems are write-head storage and write-head contact. First, these differences are in the drive mechanism and not inherent to the magnetic media; second, as the LUL system performs read/write operations by passing over the surface, the topography of the surface is less critical, i.e. while a smoother surface is preferable is it not required as long as the topography does not bring the head into contact with the disk. (Column 1 Line 1 – Column 2 Line 17).

15) With specific regard to Claim 2, which contains all the limitations of Claim 1 as listed above, '606/477 teaches the method of Claim 1 wherein:

- a) The mixed gas is a mixture of a low-molecular weight straight-chain hydrocarbon-based gas ('606 paragraph 0094 for definition of low-molecular-weight, paragraph 0237 for description of mixture, paragraph 0238 for listing of allowable hydrocarbons which include Applicant's selection) and a nitrogen gas ('606 paragraph 0237).

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16) With specific regard to Claim 6, which contains all the limitations of Claim 1 as listed above, '606/'477 is silent as to the specific Raman spectroscopy properties of the deposited film. However:

- a) The Raman spectroscopy results are dependent on the chemical composition of the material being analyzed.
- b) Applicant's claimed method produces acceptable Raman spectroscopy results.
- c) '606/'477 teaches a method which deposits a film under the same conditions as claimed by Applicant.
- d) Therefore, Examiner has a reasonable expectation that a film deposited by the method of '606/'477 in accordance with the parameters of Applicant must necessarily produce a film with the same Raman spectroscopy properties as those of Applicant. When a reference discloses the limitations of a claim except for a property, and the Examiner cannot determine if the reference inherently possesses that property (in this case, the B/A ratio of the Raman spectrum), the burden is shifted to Applicant(s). *In re Fitzgerald*, USPQ 594 and MPEP §2112.

17) With specific regard to Claim 7, which contains all the limitations of Claim 2,

'606/'477 teaches the method of Claim 2 wherein:

- a) The low-molecular-weight straight-chain hydrocarbon-based gas is acetylene ('477 Column 18 Lines 12 - 53 for the acetylene - nitrogen system).

18) Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over '606/'477 in view of Suzuki et al (U.S. Patent 6,680,112, hereinafter '112).

19) With specific regard to Claim 3, which contains all the limitations of Claim 1,

'606/'477 teaches the method of Claim 1 in its entirety.

- a) '606/'477 also teaches a lubricating film wherein the upper surface of said film reduces surface friction ('606 Paragraphs 0513-0517).
- b) '606/'477 does not teach the limitation of Claim 3, which specifies that the method of Claim 1 further comprises exposing the carbon-based protective layer to nitrogen plasma after forming the carbon-based protection layer.
- c) '112 teaches that using an etching gas, wherein nitrogen is explicitly cited as a valid example among other gases that can generate a plasma (Column 5 Lines 16-29), allows for controlling the affinity of the DLC film to a lubricant film (Column 4 Lines 21-45, 50-56), promoting adhesion of the lubricant film to the DLC film.
- d) Examiner takes the position that the invention of Claim 3 is suitable for use in a CSS system. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).
- e) Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the plasma-etching step of '112 to the selected method of '606 because '606 teaches a lubricating film, '112 teaches a method to improve the affinity between the lubricating film and the DLC film, and the selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness.

20) With specific regard to Claim 4, which contains all the limitations of Claim 3 as listed

above, '606/'477/'112 teach all the limitations of Claims 1 and 3.

a) '606/'477/'112 further teaches forming a lubrication layer after exposing the carbon-based protection layer to nitrogen plasma ('606 paragraph 0247).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsuo et al (U.S. Patent 5,837,357) and Sasaki et al (U.S. Patent 6,455,101) are both documents detailing information relevant to the manufacture of carbon protective layers and/or magnetic recording media.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL G. MILLER whose telephone number is (571)270-1861. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael G. Miller/
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792